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SOME ASPECTS OF PLASTIC POLLUTION

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Besides the radioactive waste produced by atomic plants and carbon monoxide, carbon dioxide and some other dangerous gases emitted due to the burning of hydrocarbon fuel, the next threat to our civilization is from the continuous deposit of non-biodegradable plastics on the surface of the earth. The land, the sea surface, the sea bottom, the mountain valleys, the poles, no region is now devoid of the presence of plastics.

Plastic, in its various forms, is limiting our days on earth by influencing various aspects of life. Many scientists and environmental specialist all over the world have studied the harmful effect of plastics in detail and all of them are of the same view regarding the degree of harm they represent to us. Apart from the introduction of many types of poisons in environment and in our body, plastics also block the sewage system of urban areas, adversely affect the riverbed and estuary and bring destructive change in the biodiversity to a large extent.

PLASTICS AND THEIR USE

Plastics are petroleum-based products, and they are used in various forms. Each form of plastic production requires huge amount of mineral oil. The basic principle for production of plastic is the conversion of natural gas or crude oil components into monomers like ethylene, propylene, butane and styrene in presence of catalysts. Then, these monomers are chemically bonded to a chain called a polymer. Different combinations of monomers along with different additives (Chlorine, Nitrogen, Fluorine, Oxygen etc.) and colour materials make different types of plastics.

The low-density polyethylene (L D P E) is the form of plastic that is used for production of polythene bags. High-density polyethylene is used for production of buckets, bowls, cups, plates, packets for cement and fertilizers and large sized bottles. Polyvinyl chloride (P.V.C) is used for production of rexine, shoe soles, toys, pipes, tubing, blood and plasma transfusion bags etc. Polycarbonate (P.C.) is used to produce baby feeding bottles, large water bottles etc. The thermo set poly urethane (P.U.) is used to produce all types of foams. Polypropylenes (P.P.) is used to prepare packaging materials for edible items, luggage carrier and textile cones. Polyethylene terephthalate (PET) is used to prepare bottles for many purposes.

TOXICITY OF PLASTICS

All types of plastic require a huge amount of mineral oil for their production and transportation. So, the process of plastic synthesis causes depletion of hydrocarbon fuel storage at a high rate and produces dangerous gases. Only polyurethane (P.U) consume 11 percent of total production of chlorine and 85 percent of total production of dangerous ‘phosgene’ gas of the world during its formation. Always there is a chance for occupational hazards of workers and

the death of a huge number of human, animals and plants due to accidental leakage. Plastics themselves are also toxic, and the key for their toxicity remains in the history of their production.

Plastics are the product of several types of monomers as a result of polymerization. Almost all such monomers that make up plastics are carcinogenic, mutagenic and as well as disruptive of the normal functions of the endocrine system. As the polymerization process cannot be made perfect at any time, so some toxic monomers are present in the plastics. Beside these loose monomers, other toxic materials are also present in the plastics. Among them, the colour materials (mainly Lead and Cadmium based pigments) and other additives like foaming agents, plasticisers etc. which are used during preparation of various types of plastics and remain in it as a part, are very much toxic and most of them are carcinogenic. They all remain poorly bonded with the plastic polymers and tend to leach out and mix with the adhered materials, which may be liquid, semisolid or solid. All plastics produce many dangerous gases during the process of their production. Thus, the use of plastic is synonymous with bringing pollution to environment and affecting health.

During burning, all types of plastics emit some very toxic gases, so it is not considered a way to get rid of the accumulated load of plastics on earth. Only a few types of plastic can be recycled another two or three times, but in the process it is hazardous for health of the people who are engaged in collection of thrown plastics from dirty dustbins and also work in the factory of recycling. During recycling, many toxic gases are emitted, and the quality of the recycled plastics are worse than the original one. The process is also not economically feasible. Recycling of plastic is not a very common practice in our country. So, all types of plastic are born to remain as a source of continuous threat for ages.

PLASTIC POLLUTION IN URBAN AREAS

In the urban area of our country, people throw materials like unused or rotten vegetables, uneaten food and snacks etc. after packing them with plastic packets in the garbage box. In many places, because of the absence of organized garbage disposal or people's bad habits, such packets are littered here and there. In the rural areas, villagers are also accustomed to using plastic packets and they also throw the empty packets after use. Most of the time, these packets contain some food or vegetable items or traces of materials like juice, molasses, cakes, biscuits and other foods.

Animals are not able to distinguish plastics from straw and other cellulose containing materials. So, it is not very uncommon for the herbivorous animals, mainly cattle and buffaloes, and also sheep and goats to consume plastic packets (mainly of Polyethylene and Polypropylene origin) thinking them to be food.

These animals cannot digest them, and so show the symptoms of recurrent bloat and are generally treated by carminative drugs. But if this process of eating plastics continues for a long period, then continuous accumulation of such plastic packets happen inside the first chamber of their four-chambered stomach. These plastic packets cause many problems. The vegetable or other materials entrapped inside the packets are not digested properly as ruminal micro flora and other secreted materials of the animals cannot reach properly inside the packets.

The plastic packets cannot go from rumen to the next chamber, the reticulum, through the small tunnel called rumino-reticular groove. Thus most of the ingested plastic packets remain in the rumen along with the stagnated and decomposed feed particles inside it. Only some small fragments of the ingested plastics may pass from rumen to reticulum and then omasum and ultimately to the last chamber, abomasum. Plastics cannot pass through, but the toxic materials of the plastics leach out and ultimately reach the blood stream of the animal after absorption.

A REAL THREAT TO ANIMAL HEALTH

After the accumulation of plastic packets in the rumen reaches a certain limit, the affected animal suffers acute tympany, which does not respond to any type of carminative or purgative drugs. The actual condition remains undiagnosed in almost all the cases and the ultimate fate of such animal is death.

Accumulation of many types of drugs inside the cells could affect the normal functioning of a cell, tissue or organ of an animal or human being. The absorption of lead and cadmium-based toxic colouring materials, additives and the toxic monomers of the plastic packet etc. can not only cause toxicity in animals, but they can reach human tissues through consumption of milk and meat. Continuous deposition of various medicinal drugs, agricultural insecticides and pesticides, poisonous adulterating chemicals, toxic preservatives and other colouring materials used in fast food items and such various types of toxins together in the cellular level are dangerous, and pose a great threat to mankind. As human beings are at the top of food chain, they ingest such drugs through consumption of food and food products made from meat, milk and eggs.

This subject requires detailed study.